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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,754	03/08/2004	Sun-Ha Hwang	4591-393	4368

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EXAMINER

KIM, SU C

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 10/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/796,754

Applicant(s)

HWANG ET AL.

Examiner

Su C. Kim

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 5-17 is/are allowed.
6) ☒ Claim(s) 1-4 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 08 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/08/2004.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment was received on 8/03/2005, and has been entered and made of record. Currently claims 1-17 are pending.

Specification

2. The corrected or substitute specification was received on 8/03/2005. The specification is acceptable.

Drawings

3. The corrected or substitute drawings were received on 8/03/2005. The drawings are acceptable.

Response to Arguments

4. Applicant's argument filed on 8/03/2005 has been fully considered but they are not persuasive.

In response to applicant's argument regarding to the rejection of claims 1-3, a recessing region "a" is under impurity diffuse region 30, which is lightly doped drain(LDD) ion implant region and "formed silicide layer covering the impurity diffused region" (Fig 4 & 5). Also silicide layer 40 covered the exposed portion of the substrate

(Fig. 3, 4 & 5). In fig. 5, the portion of the substrate is exposed at area of element **40** which is ion implanted in fig. 4. that still is considered as the substrate (substrate define by The American Heritage® Concise Dictionary : "An underlying layer").

In response to applicant's argument regarding to claim 1-3 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., " device isolation layer to form a step difference") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Also, claim 1 fails to describe any sequential orders or steps to form isolating layer in claim 1. Particularly, claim 1 includes "exposing a portion of the substrate material under the substrate material and forming a salicide layer covering the impurity diffused region and covering the exposed portion of the substrate". Baek discloses to form metal plug **70** by mask etching. Baek discloses the mask etching step to expose "a portion of the substrate material under the substrate material" (**Fig. 6 Page 8 lines 1-3**) before filling up metal plug and "forming a salicide layer covering the impurity diffused region and covering the exposed portion of the substrate (**Fig. 5, page 7 lines18-20**). In claim 1, applicant fails to specify any sequential orders or steps to form the invention in claim 1. Therefore, Baek anticipates claim 1 due to fail to specify sequential orders or process steps.

In the response to argument regarding to claims 2-3, claims 2-3 depend from rejected claim 1.

Therefore, the rejection of claims 1-3, as cited in the Office action dated 5/3/2005, under 35 U.S.C. 102(a), as being anticipated by Baek et al. is maintained and repeated in this Office action.

In response to applicant's argument, rejection of claim 4 under 35 U.S.C. 103(a) Baek discloses elements in claim 1 as the above response with respect to claims 1-3. However, Baek fails to specify conductive materials to form silicide. Violette discloses "titanium" (**Column 4 lines 20**) to form "self-aligned metal silicide (salicide)." In view of Violette, it would have been obvious to one of ordinary skill in the art to incorporate materials of Violette into the Baek.

Therefore, the rejection of claim 4, as cited in the Office action dated 5/3/2005, under 35 U.S.C. 103(a), as being anticipated by Baek et al. in view of Violette. is maintained and repeated in this Office action.

Remark

Upon review of the reference of Baek et al. (Kr 2001-65747), which was cited in the Office action dated 5/03/2005 under 35 U.S.C 102(a), As anticipating claims 1-3 & 4

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the examiner notes that the reference can still be interpreted as anticipating the claims, as currently amended.

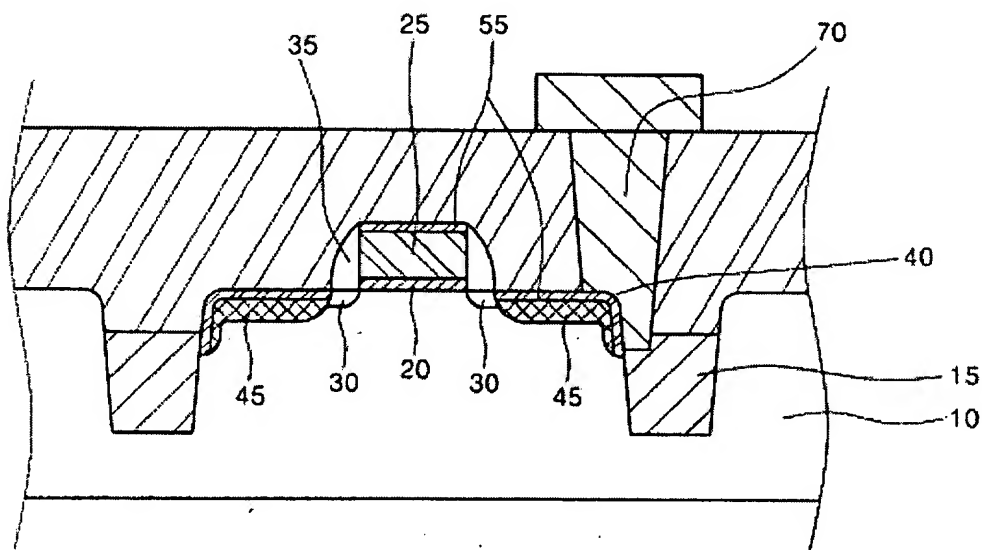
Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-3 are rejected under 35 U.S.C. 102(a) as being anticipated by Baek (Kr 1020010065747).



Baek discloses a method of fabrication a semiconductor as claimed. **See all the FIGS** where Baek teaches the following limitations

5. Pertaining to claim1, Baek discloses a method of fabricating a semiconductor substrate, comprising:

forming an isolation layer **15** in a substrate of first conductivity type **10**, to define an active region;

diffusing impurities **30 & 40** of second conductivity type in a predetermined region of the active region to form an impurity diffused region;

recessing a region of the devise isolation layer and exposing a portion of the substrate material under the impurity diffused region **30 & 40** (**Fig. 2 & 3 page 7 lines 1-2 Please note Baek discloses “the device isolation layer 15 is etched to have a given depth and round the edge of the substrate” and it is considered as recessing a region of the devise isolation layer and clearly exposing a portion of the substrate**); and

forming a salicide layer **55** covering the impurity diffused region **45** and covering the exposed portion of the substrate.

6. Pertaining to claim 2, Baek discloses the method of claim 1, in which the recessing a region of the isolation layer **15** and exposing a portion of the substrate comprises etching the device isolation layer to a depth deeper than a depth of the impurity diffused region **30** (**Fig 4 Please note device isolation layer 15 is deeper from surface of source/drain on fig. 4, than a lightly doped drain 30 (LDD)**)).

7. Pertaining to claim 3. Baek discloses the method of claim 1, in which the forming the silicide layer comprises:

forming metal **55** on the impurity diffused region **40** on the active regions and on the walls of the recess **40** (**Please note silicide layer 55 covers ; and**

annealing the metal layer to diffuse atoms of the metal into portions of the active region in contact with the metal and into portions the substrate of first conductivity type in contact with the metal (**Page 7 lines 22-23, Please note silicide is formed with various metal annealing on silicon or silicon substrate and apply heat (annealing the metal layer) to diffuse atoms of the metal into active region. it is the well known process to form silicide**)).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baek in view of Violette.

8. Pertaining to claim 4 Baek fails to teach the method of claim 3, in which the metal comprises at least one material selected from the group consisting of cobalt, titanium, and nickel.

Violette teaches at least one material selected from the group consisting of cobalt, titanium and nickel.

In view of Violette, it would have been obvious to one of ordinary skill in the art to incorporate the material of Violette into the Baek semiconductor process because titanium can be a self-aligned silicide (salicide) (column 4, line 20-21)

Allowable Subject Matter

Claims 5 -17 are allowed.

The following is an examiner's statement of reasons for allowance: "patterning the device isolation layer to form a recess that exposes a portion of the substrate of first conductivity type", which is not doped substrate.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Su C. Kim whose telephone number is (571) 272-5972. The examiner can normally be reached on Monday - Friday, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Su C. Kim
09/28/2005



W. David Coleman
Primary Examiner